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Aerosol climatology over Japan site measured by ground-based Sky radiometer

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Temporal and spatial aerosol optical characteristics are studied using data from ground-based and ship-borne (on-board ship) sky radiometer (POM series: Prede Co. Ltd., Tokyo, Japan) measurements in the world (Aoki and Fujiyoshi, 2003, Aoki, 2008). We started the long-term monitoring of aerosols optical characteristics since 1994, by using a sky radiometer (http://skyrad.sci.u-toyama.ac.jp/). The sky radiometer is an automatic instrument that takes observations only in daytime under the clear sky. Observation of direct and aureole interval was made every ten minutes by once. There were used to measure direct solar irradiance and diffuse solar radiance at seven or eleven wavelength. The aerosol optical characteristics were computed using the SKYRAD.pack version 4.2 developed by Nakajima et al. (1996). The aerosol distributions have been derived from satellite data (e.g. MODIS, GOSAT), and have been simulated in numerical model (e.g. SPRINTARS), which assume optical parameters. However, these distributions are difficult to derive because of variability in time and/or space. Therefore, a ground-based and ship-borne measurement of aerosol is necessary to validate satellite and numerical model. In this study, we present the temporal and spatial variation and the relationship of Angsrom parameters (i.e. aerosol optical thickness at each wavelength and Angstrom exponent) at Sapporo (43N08N, 141.34E), Toyama (36.70N, 137.19E), Nagasaki (32.79N.129.87E), Kasuga/Fukuoka (33.52N, 130.48E) and Cape Hedo/Okinawa (26.87N, 128.25E) site. The aerosol optical thickness at 0.5 μm has a clear seasonal cycle in Japan area, with a vernal maximum and an autumnal minimum, but on the coast of the Japan Sea area the seasonal cycle is sometimes early summer maximum. The Angstrom exponent, a, has a clear seasonal cycle in Japan, where autumn to winter maxima and springtime minima are observed. We provide the information, in this presentation, on the optical properties of Aerosol comparisons between ground observations (sky radiometer) and numerical model (SPRINTARS) with respect to their temporal and spatial variability over Japan site.